

Natasha Mhatre

March 2021

Department of Biology, University of Western Ontario, London, Ontario, Canada

Email: natasha.mhatre@gmail.com

nmhatre@uwo.ca

Phone no: (519)-661-2111 ext 84505

EDUCATION

- 2002-2008** **PhD** (Biological Sciences)
Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India
- 1999- 2002** **MSc** (Biological Sciences)
Division of Biological Sciences, Indian Institute of Science, Bangalore, India
- 1996-1999** **BSc** (Life Sciences and Biochemistry)
St. Xavier's college, University of Mumbai, India

RESEARCH POSITIONS

2019 – present Canada Research Chair in Invertebrate neurobiology

2019 – present Brain and Mind Institute, associate member

2018 – present Assistant Professor

Department of Biology, University of Western Ontario, London, Canada

2014 – 2018 Postdoctoral Fellow

Department of Biological Sciences, University of Toronto, Scarborough, Canada

2013 – 2014 Fellow of the College of Life Sciences

Wissenschaftskolleg zu Berlin (Institute of Advanced studies), Berlin, Germany

2010 – 2012 Marie Curie Research IIF Fellow &

2012 – 2013 BBSRC Research assistant

School of Biological Sciences, University of Bristol, Bristol, UK

2008 – 2010 UKIERI Research associate

School of Biological Sciences, University of Bristol, Bristol, UK

& Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India

2002-2008 Doctoral candidate

Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India

PUBLICATIONS**Peer-reviewed (324 citations, h index=12; i-10 index=12 on Google scholar)**

1. [\(2021\)](#) Erin Brandt, Yoshan Sasiharan, Damian O. Elias, **Natasha Mhatre**. Jump takeoff in a small jumping spider. *J. Comp. Physiol. A*, 207, pages 153–164.
2. [\(2020\)](#) Christopher Bergevin, Chandan Narayan, Joy Williams, **Natasha Mhatre**, Jennifer Steeves, Joshua GW Bernstein, and Brad Story. Overtone focusing in biphonic Tuvan throat singing. 2020;9:e50476.
3. [\(2020\)](#) Christopher Bergevin, Andrew Mason, and **Natasha Mhatre**. Evidence supporting synchrony between two active ears due to interaural coupling. *Journal of the Acoustical Society of America*. 147(1), EL25.
4. [\(2018\)](#) Penghui Sun, **Natasha Mhatre**, Andrew Mason, and Jayne Yack. In that vein: inflated wing veins contribute to butterfly hearing. *Biology Letters*. 14(10) 20180496.
5. [\(2018\)](#) **Natasha Mhatre**. Tree cricket baffles are manufactured tools. *Ethology*.124(9),691-693;
6. [\(2018\)](#) **Natasha Mhatre** and Daniel Robert. The drivers of heuristic optimization in insect object manufacture and use. *Frontiers in Psychology*, 9, 1015;
7. [\(2017\)](#) **Natasha Mhatre***, Robert Malkin*, Rittik Deb*, Rohini Balakrishnan, and Daniel Robert. Tree crickets optimize the acoustics of baffles to exaggerate their mate-attraction signal. *eLife*, 6:e32763 DOI: 10.7554/eLife.32763. * contributed equally
8. [\(2016\)](#) **Natasha Mhatre**, Gerald Pollack, and Andrew Mason. Stay tuned: active amplification tunes tree cricket ears to track temperature-dependent song frequency. *Biology Letters*. DOI: 10.1098/rsbl.2016.0016, 12(4), 20160016.
9. [\(2015\)](#) **Natasha Mhatre**. Active amplification in insect ears: mechanics, models and molecules *Journal of Comparative Physiology A*. DOI: 10.1007/s00359-014-0969-0 201(1), 19-37 (Invited review).
10. [\(2014\)](#) Robert Malkin*, Thomas R. McDonagh*, **Natasha Mhatre***, Thomas S. Scott & Daniel Robert. Energy localisation and frequency analysis in the locust ear. *Journal of the Royal Society Interface*. 11(90), 20130857. *contributed equally.
11. [\(2013\)](#) **Natasha Mhatre** and Daniel Robert. A tympanal insect ear exploits a critical oscillator for active amplification and tuning. *Current Biology*. 23(19), 1952-1957.
12. [\(2013\)](#) K. Rajaraman, **Natasha Mhatre**, M. Jain, M. Postles, R. Balakrishnan and D. Robert. Low-pass filters and differential tympanal tuning in a paleotropical bushcricket with an unusually low frequency call. *Journal of Experimental Biology*. 216, 777-787.
13. [\(2012\)](#) **Natasha Mhatre**, F. Montealegre-Z, R. Balakrishnan, D. Robert. Changing resonator geometry to boost sound power decouples size and song frequency in a small insect. *PNAS*. 109(22) E1444-E1452, [Cover: Issue 22, May 29 2012]
14. [\(2011\)](#) **Natasha Mhatre**, M. Bhattacharya, R. Balakrishnan, D. Robert. Matching sender and receiver: poikilothermy and frequency tuning in a tree cricket. *Journal of Experimental Biology*. 214, 2569-2578.
15. [\(2009\)](#) **Natasha Mhatre**, F. Montealegre-Z, R. Balakrishnan, D. Robert. Mechanical response of the tympanal membranes of the tree cricket *Oecanthus henryi* (Orthoptera: Gryllidae: Oecanthinae). *Journal of Comparative Physiology A*. 195(5): 453-462.
16. [\(2008\)](#) **Natasha Mhatre** and R. Balakrishnan. Predicting acoustic orientation in complex real-world environments. *Journal of Experimental Biology*. 211:2779-2785.

17. (2007) **Natasha Mhatre** and R. Balakrishnan. Phonotactic walking paths of field crickets in closed-loop conditions and their simulation using a stochastic model. *Journal of Experimental Biology*. 210:3661-3676.
18. (2006) **Natasha Mhatre** and R. Balakrishnan. Male spacing behaviour and acoustic interactions in a field cricket: implications for female mate choice. *Animal Behaviour*. 72:1045-1058.
19. (2004) S. Namboori, **Natasha Mhatre**, S. Sujatha, N. Srinivasan and S. B. Pandit Enhanced functional and structural domain assignments using remote similarity detection procedures for proteins encoded in the genome of Mycobacterium tuberculosis H37Rv. *Journal of Biosciences*. 29(3): 245-59.
20. (2002) S. B. Pandit, D. Gosar, S. Abhiman, S. Sujatha, S. S. Dixit, **Natasha S. Mhatre**, R. Sowdhamini and N. Srinivasan. SUPFAM—a database of potential protein superfamily relationships derived by comparing sequence-based and structure-based families: implications for structural genomics and function annotation in genomes. *Nucleic Acids Research*. 30(1): 289-293.

In revision or preprint

1. (2018) **Natasha Mhatre***, Senthurran Sivalingham*, Andrew C. Mason. Posture controls mechanical tuning in the black widow spider mechanosensory system. (* co-first authors). bioRxiv, 484238

Book

(2008) **Natasha Mhatre**. Secret Lives: Biodiversity of the Indian Institute of Science campus, IISc press, Bangalore, India.

Conference proceedings

1. (2018) **Natasha Mhatre**, and Robert, D. Tympanal spontaneous oscillations reveal mechanisms for the control of amplified frequency in tree crickets. Proceedings of Mechanics of Hearing, 2017 (130004).
2. (2018) Bergevin, C, **Natasha Mhatre**, and Mason, A. Comparing external tympanum vibration and spontaneous otoacoustic emissions. Proceedings of Mechanics of Hearing, 2017 (130002).
3. (2012) **Natasha Mhatre**., Montealegre-Z, F., Balakrishnan, R., and Robert, D. "Sound reception and radiation in a small insect," in Acoustics 2012 (Nantes, France).
4. (2011) Robert, D., **Natasha Mhatre**, and McDonagh, T. "Mechanical processing of acoustic information in the ear of the desert locust," in Sensors, 2011 IEEE, pp. 817-820.
5. (2010) Robert, D., **Natasha Mhatre**, and McDonagh, T. "The small and smart sensors of insect auditory systems," in Sensors, 2010 IEEE, pp. 2208-2211.

Database authorship

1. PALI: Phylogeny and ALIGNment of homologous protein structures (Release 1.3).
2. SUPFAM v2.1: Database of super-family related protein sequence families.

MAJOR GRANTS AND FELLOWSHIPS

2020-2025 Ontario Research Fund, Small Infrastructure Funds, Canada (\$219,491)

- 2020-2025** Canadian Foundation for Innovation, John Evans Leadership Fund, Canada (\$219,491)
- 2019-2024** Canada Research Chair, CRC programme, Canada (\$500,000 + \$100,000 supplement)
- 2019-2024** NSERC Discovery grant & Early Career researcher Supplement, NSERC, Canada (\$190,000+\$12,500)
- 2018-2019** Western SEED grant, Western Research, Canada (\$25,000)
- 2013-2014** Fellowship of the College of Life Sciences, Institute of Advanced studies, Berlin, Germany (€ 13,800)
- 2010-2012** Marie Curie Research IIF Fellowship, School of Biological Sciences, University of Bristol (€ 173,240)
- 2011-2014** BBSRC responsive mode grant, School of Biological Sciences, University of Bristol (£ 471,449). Co-wrote grant with Prof. Daniel Robert, Prof. Martin Homer, and Prof. Tom Scott, however, could not be named as co-applicant but was named as pre-existing Marie Curie fellow.
- 1999-2007** Integrated PhD scholarship (MSc & PhD) Indian Institute of Science, Bangalore, India (Rs.30,000 -168,000 pa changing scale)

INVITED TALKS

1. (2021) Behaviour, Ecology and Evolution Seminar series, Department of Zoology, Cambridge University.
2. (2021) AuralDiversity - Multispecies, Sussex Humanities Lab, University of Sussex.
3. (2021) Laurier Biology Seminars, Wilfred Laurier University.
4. (2021) Max-Planck-Institut fur Ornithologie, Seewiesen, Germany.
5. [\(2020\) Department of Zoology, Punjab university, India](#)
6. [\(2020\) World Wide Neuro forum: Invertebrate Neurobiology, International.](#)
7. (2020) Department of Biology, University of Toronto at Mississauga, Canada.
8. (2019) Department of Ecology, Evolution and Behaviour, University of Minnesota, USA.
9. (2019) Symposium: How brains and bodies interact to generate behaviour - neuronal plasticity and biomechanics. Society of Experimental Biology Annual meeting, Seville, Spain.
10. (2019) Physiology and Pharmacology Seminar series, Western University.
11. (2019) Brain and Mind Institute coffee break talks, Western University.
12. (2018) Symposium Insects in 3D - Current Uses and Future Directions for High Resolution 3D Data at the Entomological Society of America, Vancouver, Canada.
13. (2018) Meeting on Quantitative Approaches to Naturalistic Behaviors at the Banbury Center of Cold Spring Harbor Laboratory, Lloyd Harbor, USA.
14. (2018) Keck School of Medicine, University of Southern California, USA.
15. (2018) 175th meeting of the Acoustical Society of America, Minneapolis, USA.
16. (2016) Institute of Integrative Research, Humboldt University, Berlin, Germany.
17. (2016) Department of Biological Sciences, University of Cincinnati, Cincinnati, USA.
18. (2015) **Plenary speaker** at 15th International Meeting on Invertebrate Sound & Vibration
19. (2015) Rockefeller University, USA.
20. (2015) National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bangalore, India.
21. (2015) Department of Biology, Carleton University, Ottawa, Canada.

22. (2014) School of Biological Sciences, Macquarie University, Sydney, Australia.
23. (2014) Computational biology group, The Institute of Mathematical Sciences, Chennai, India.
24. (2014) Centre for Nanoscience and Engineering, Indian Institute of Science, Bangalore, India.
25. (2014) Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India.
26. (2014) National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bangalore, India.
27. (2014) School of Biosciences, Cardiff University.
28. (2014) Workshop on 'Internally coupled ears'. Institute for Advanced Study, Technische Universität München, Munich, Germany.
29. (2014) College of Life and Environmental Sciences, University of Exeter, Falmouth, UK
30. (2014) Institute of Neuroscience, University of Newcastle, Newcastle upon Tyne, UK.
31. (2014) Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Stechlin, (IGB Stechlin), Germany.
32. (2014) School of Biological Sciences, University of Edinburgh, UK.
33. (2014) Freie Universitaet, Berlin, Germany.
34. (2014) Max Delbruck Centre for Molecular Medicine, Berlin-Buch, Germany.
35. (2014) Animal communication workshop between University of Maryland and Eberhard Karls University, Tübingen.
36. (2013) Max Planck-Institute for the Physics of Complex Systems, Dresden, Germany.
37. (2013) University College London, Ear Institute, London, UK.
38. (2012) Centre for Models of Life, Niels Bohr Institute, Copenhagen, Denmark.
39. (2012) Institute of Biology, University of Southern Denmark, Odense, Denmark.
40. (2011) XXIIIrd meeting of the International Bioacoustics Council. La Rochelle, France.

CONFERENCE PARTICIPATION

1. (2020) [Talk] Annual meeting of the Society for Integrative and Comparative Biology, Austin, Texas, USA.
2. (2019) [Talk] Invertebrate Sound and Vibration, Iowa City, Iowa, USA.
3. (2019)[Talk] Annual meeting of the Canadian Society of Zoologists, Windsor, Canada.
4. (2019)[Talk] Annual meeting of the Society for Integrative and Comparative Biology, Tampa, Florida, USA.
5. (2017) [Talk] Mechanics of Hearing, 2017, Brock University.
6. (2013) [Talk] Invertebrate Sound and Vibration, Glasgow.
7. (2013) [Poster] International Conference on Invertebrate Vision.
8. (2012) [Poster] Xth International Congress of Neuroethology, College Park, Maryland.
9. (2012) [Talk] Acoustics conference, Nantes, France.
10. (2011) [Poster] XXIII meeting of the International Bioacoustics Council, LaRochelle, France.
11. (2010) [Poster] 9th International Congress of Neuroethology, Salamanca, Spain.
12. (2009) [Poster] 10th International Congress of Orthopterology, Antalya, Turkey.
13. (2008) [Talk] XIIth Insect Sound and Vibration meeting, Tours, France.
14. (2008) [Poster] XIIth Insect Sound and Vibration meeting, Tours, France.
15. (2003) [Poster] Characterization First international conference on acoustic communication by animals, Maryland, USA.

TEACHING

Western**BG 4920** Capstone course: Seminar course in Biology (enrolment: 9)**BG 3601** Animal Physiology (enrolment: 72,79)**Students & trainees****Graduate students, advisees, and post-doctoral fellows**

Abolfazl Akbari (PhD co-supervisor: Jan 2021)

Erin Brandt (Post-doctoral-supervisor: Sept 2019)

Reese Gartly (Undergraduate thesis supervisor: Sept 2020)

Sarah Duke (Undergraduate thesis supervisor: Sept 2020)

Anastassia Mena (Undergraduate thesis supervisor: Sept 2020)

Carolyn Xin (Undergraduate thesis supervisor: Sept 2019)

Soren Coulson (PhD Thesis committee: 2019)

Jack Goldman (PhD Thesis committee: 2019)

Brendon Samuels (PhD Thesis committee: 2019)

Wesley Robinson (PhD advisory committee: 2020; MSc Defence committee: 2019)

Under-graduate student volunteers

Nancy Kim (2021); Hiba ElHasan (2020-2021); Morteza AlRabya (2020-2021); Sarah Duke (2019-2020); Nicholas Wynne (2019); Linda Wang (2019-202); Moeez Tahir (2019-2020); Yoshan Sasiharani (2020-2021); Reese Gartly (2020-2021); Parham Alibolandi (2020); Anastassia Mena (2020-2021).

Previous experience**Graduate advisees**

PhD student advisee Senthurran Sivalingham

Biomechanics of the black widow spider body and web, 2016-2017.

MSc advisees

María Teresa Pérez Zaballos

Understanding the locust ear through computer simulation and bio-inspired sensor design.

MSc dissertation, 2012, the University of Bristol Physics prize. (Informal supervision)

Undergraduate advisees

Amy Morris-Drake & Alexandra Meredith-Hardy: (Third year BSc project) Sound induced hearing damage in crickets. Autumn, 2012.

Henry Leonard & Joshua Rees: Tool use and singing behavior in crickets. Summer, 2012.

Amber Gabb: Particle velocity detection in Scorpions: Autumn, 2012.

Jeremy Chai: Anisotropy of black widow web stiffness. Autumn, 2017.

Programming in Matlab mini-course and tutorials

10 PhD candidates, 2009, Centre for Ecological Sciences, Indian Institute of Science

Lectures in Animal Behaviour: mechanisms and evolution

15 PhD candidates, Centre for Ecological Sciences, Indian Institute of Science.

Bio-mimetic robotics: 2006, 2007, 2008.
Sensory processing and stimulus coding; 2009

SERVICE TO PROFESSION

Grant reviews:

Ministry for Education and Science, Portugal, EU
European commission, Horizon 2020, MSCA-IF-2016, MSCA-IF-2017 & MSCA-IF-2018.
European commission, ERC Starting grant 2019.
BrainsCAN 2020, 2021

Journal reviews: PNAS, Current Biology; Proceedings of the Royal Society B; Scientific Reports; Biology Letters, Naturwissenschaften; Animal behaviour; Ethology; Journal of Experimental Biology; Journal of Vibration and Acoustics; Journal of Comparative Physiology A; Journal of the Acoustical Society of America; Journal of Orthoptera research & Current Science.

Editorial work:

1. PLOS One academic editor;
2. Editorial board of Current Research in Insect Science;
3. Guest associate editor special issue in social physics for Frontiers in Physics;
4. Associate editor for Frontiers in Insect Science;
5. Affiliate for BiorXiv.

Outreach book:

Secret Lives: Biodiversity of the Indian Institute of Science campus

This is a coffee table book with nearly 200 photographs of the wildlife on the Indian Institute of Science campus in Bangalore. This book incorporates nine chapters, which describe current theories in evolutionary biology and ecology for a lay audience.

1. Habitat: habitats and their relationship to community diversity.
2. Food: food webs and their relationship to community diversity.
3. Water: thermoregulatory physiology.
4. Sex: theory of the evolution of sex and sexual selection.
5. Babies: life history strategy theory.
6. Flight: evolution of flight and flight control.
7. Groups: theory of sociobiology.
8. Connected: interspecies interactions and co-evolution.
9. Humans: urban wildlife conservation strategies.

Popular talk

[Why do I tell stories? TEDxBerlinWomen, 2013.](#)

Significant media coverage

[Western researcher looks at 'overtone singing'](#)

[The entire black-widow spider is a sensor: The Atlantic \(2019\)](#)

[The butterflies that hear with their wings: The Atlantic \(Oct 2018\)](#)
[Acoustic masterminds: eLife podcast \(Feb 2018\)](#)
[How tree crickets use leaves to amplify mating calls: The Hindu \(20 Feb 2018\)](#)
[Tree crickets turn leaves into megaphones to attract mates: Mongabay India \(4 Jan 2018\)](#)
[Choosing to amplify: Science \(22 Dec 2017\)](#)
[Active ear amplification allows crickets to stay tuned: Outside JEB \(31 Aug 2016\)](#)
[Listening for love: How female crickets got so good at hearing their mates: WaPo \(05 May 2016\)](#)
[Laser tracking crickets: BBC Earth Juice \(July 2, 2013\)](#)
[Courtship in the Cricket World: ScienceDaily \(Apr. 30, 2012\)](#)
[Tree Cricket's Song in Tune with the Temperature: LiveScience & MSNBC \(Apr. 30, 2012\)](#)
[Tree Cricket Tunes: Science Today: California Academy of Sciences \(May 1 2012\)](#)
[Tree cricket song has note of variability: Science News \(June 2 2012\)](#)
[ScienceShot: Crickets Sing Deeper When Cold: Science magazine \(30 April 2012\)](#)
[ScienceShot: Female Crickets Hear Everything: Science magazine \(12 July 2011\)](#)
[Tree Cricket Females Listen To Everything: Inside JEB \(1 August 2011\)](#)

PERSONAL DETAILS

Born: July, 1979 in Mumbai, India

Citizenship: Indian

Languages: English, Marathi, Hindi, Rudimentary French.